REMARKS

Claims 15-30 are pending in this application. Claims 15, 16, 17, 20, 21 and 23 have been amended in several particulars for purposes of clarity and brevity while Claims 24-30 have been newly added in accordance with current Office policy, to further and alternatively define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application.

Claims 15-23 have been rejected under 35 U.S.C. §112, 1st paragraph, as failing to comply with the written description requirement. Specifically, the Examiner asserts that the specification does not disclose the process defined in base claims 15 and 21, that is, generating "a single monochromatic image using data of obtained plurality of images and image data of the synthesized image." For purposes of expedition, base claims 15 and 21 have been amended to define that the "single monochromatic image data" is obtained based on the "single synthesized image data" in consistent with FIG. 3, page 11 lines 11-27 of Applicants' specification, as noted by the Examiner in order to render the rejection moot.

Claim 20 has been rejected under 35 U.S.C. §112, 2nd paragraph, as failing to provide proper antecedent basis for the term "selected color of three colors". In response thereto, claim 20 has been amended to overcome the rejection.

Claims 15-23 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Howell et al., U.S. Patent No. 6,047,772, in view of Hamada, U.S. Patent No. 5,960,128 for reasons stated on pages 4-6 of the Office Action (Paper No. 15). As discussed, for purposes of expedition, base claims 15 and 21 have been amended to further define that the "single synthesized image data" is generated by one color image and the same color image obtained by shifting by a

distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction, and that such "single synthesized image data" is output as "single monochromatic image data", features that are **not** disclosed or suggested by either Howell '772 or Hamada '128, whether taken individually or in combination.

For example, independent claim 15, as amended, defines an image processing apparatus as comprising:

> an imaging optical system for forming an image of an object on an imaging surface;
> a color imaging device including photo-detectors and a color filter arranged on the imaging surface in two-dimensions, for performing photoelectric conversion of the image of the object formed by the imaging optical system;
> shift drive means for shifting the imaging optical system and the photo-detectors relative to each other; and
> a control unit for generating **single synthesized image data** using image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction;
> wherein the control unit includes output means for outputting the single synthesized image data as **single monochromatic image data**.

As expressly defined in base claim 15, two image data (a) and (b) of only one color are synthesized to generate single monochromatic image data of the only one color, including:

(a) an image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and
(b) an image data of an image of the object obtained through the above-selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface un a predetermined direction.

In addition, "the control unit" is provided with "output means for outputting the single synthesized image data as a single monochromatic image data". As a result, the monochromatic image data of high resolution can be advantageously obtained using the color imaging device.

Likewise, base claim 21, as amended, defines an image processing method comprising:

> forming an image of an object on an imaging surface of a color imaging device by an imaging optical system;
> extracting **first image data** of the image of the object of a selected only one color from the image of the object formed on the imaging surface;
> shifting the image of the object formed on the imaging surface by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction;
> extracting **second image data** of the image of the object of the selected only one color from an image of the object obtained after shifting is performed;
> synthesizing the first and second image data to generate **single synthesized image data**;
> outputting the single synthesized image data as **single monochromatic image data**.

Again, the synthesized image data is obtained by synthesizing the first image data of the image of the object of a selected only one color from the image of the object formed on the imaging surface, and the second image data of the object obtained after shifting is performed. As a result, the monochromatic image data of high resolution can be advantageously obtained using the color imaging device.

In contrast to Applicants' base claims 15 and 21, Howell '772, as a primary reference, discloses a combination of digital camera design and digital photography technique that allows a single digital camera to be used for both single-shot and multiple-shot color operation. However, color data to be used for interpolation is entirely different from that of Applicants' claimed image processing technique. For

example, on column 8, line 66 extending to column 9, line 27, and FIG. 6, Howell '772 discloses that image data including three colors on upper left portion of FIG. 6 and another image data including three colors on upper right portion of FIG. 6 which is obtained by shifting by one pixel in right direction are obtained, and then the two image data are synthesized. In the synthesized image data, pixel data of green appear on all pixels and pixel data of red and blue appear on a half of pixels, as shown in the middle portion of FIG. 6. Therefore, each pixel data is a synthesized data of green pixel data and red pixel data, or alternatively, green pixel data and blue pixel data, as shown in the bottom in FIG. 6. In this way, Howell '772 obtains a high quality image in the two-shot operation.

As described above, Howell '772 discloses techniques to synthesize two image data including three colors. In other words, Howell '772 only discloses a known technique as expressly acknowledged in the Background Section of Applicants' specification, on page 4, line 28 extending to page 6, line 3 of Applicants' specification. Because image data including different colors are used for interpolation, an extra time is required for generating or forming a synthesized image.

Howell '772 does **not** disclose or suggest any technique to synthesize only one color image and another same color image obtained by shifting by a predetermined distance to output the synthesized one color image as a monochromatic image as expressly defined in each of Applicants' base claims 15 and 21. According to Applicants' base claims 15 and 21, a plurality of image data of only one color (for example, green) are obtained by shifting an image of an object by

a predetermined pitches. The plurality of image data of one color are synthesized to form and output a single monochromatic image data of high resolution.

As a secondary reference, Hamada '128 does **not** remedy the noted deficiencies of Howell '772 in order to arrive at Applicants' claims 15 and 21. This is because Hamada '128 is only cited for allegedly disclosing "shifting an image sensor and an optical system relative to each other a plurality of different directions to generate a single image using the data of the plurality of images as shown in Figs. 5A-5P in order to generate an image of high resolution (column 3, lines 34-43). Therefore, even if the image sensor and the optical system are shifted in the manner suggested by Hamada '128 and incorporated into the digital photography device of Howell '772, the proposed incorporation still will not arrive at the image processing apparatus of Applicants' base claims 15 and 21.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, the Examiner must show that (1) the prior art reference (or references when combined) must teach or suggest all the claim limitations; (2) there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings; and (3) there is a reasonable expectation of success when the reference teachings are combined. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and **not** based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In addition, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "Obviousness cannot be established by

combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." ACS Hospital System, Inc v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Examiner must point to something in the prior art that suggests in some way a modification of a particular reference or a combination of references in order to arrive at Applicants' claimed invention. Absent such a showing, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention.

In the present situation, both Howell '772 and Hamada '128 fail to disclose and suggest many novel features of Applicants' base claims 15 and 21. Therefore, Applicants respectfully request that the rejection of Applicant's base claims 15 and 21 and their respective dependents be withdrawn.

Claims 24-30 have been newly added to alternatively define Applicants' disclosed invention over the prior art of record. These claims are believed to be allowable at least for the same reasons discussed against all the outstanding rejections of the instant application. For example, base claims 25, as newly added, also comprises image synthesizing means for synthesizing a plurality of image data of image of object obtained through color portions of selected only one color of the color filter and output means for outputting a synthesized image data as a single monochromatic image data in the same manner as discussed with respect to Applicants' base claims 15 and 21.

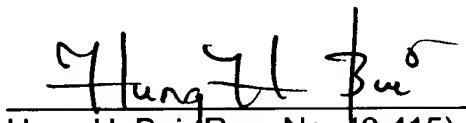
In view of the foregoing amendments, arguments and remarks, all claims 15-30 are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is

requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.40886X00), and please credit any excess fees to said deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By 

Hung H. Bui (Reg. No. 40,415)
Attorney for Applicant(s)

HHB:btd

1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Tel.: (703) 312-6600
Fax: (703) 312-6666